

Abstract

Leaves of *Protea neriifolia* R. Br. cut flowers usually turn brown or black within 4 to 8 days after harvest. Browning of leaves was observed under water stress conditions. A marginal leaf blackening as well as black spots on the leaf surface were observed when individual leaves were held in the dark. Leaf exudate collected from 10% to 30% blackened leaves in the dark showed a 3 to 5 times higher ion concentration than healthy green leaves, indicating cellular membrane damage and leakage of cell contents. Soluble polyphenol oxidase (PPO) activity also increased in the dark, due probably to the disruption of the chloroplast membrane. Sucrose (2.5 to 5% w/v) prevented leaf blackening. No ion leakage was found in leaves held in sucrose solution and soluble PPO activity remained low. Flower head removal or girdling of the stem immediately below the flower head significantly delayed leaf blackening. Nectar production (2.7 to 9.8 ml per flower with 15 to 23.5% total sugar content) was found in the flower head when the flower matured. When sucrose-¹⁴C was applied to a flower stem leaf for 24 hr, more than 50% of the radioactivity was found in the nectar. The results suggest that flower head growth and nectar production make the flower a strong sink for available carbohydrates. Carbohydrate withdrawal from the leaves remaining on a cut flower stem may lead to a carbohydrate depletion in the leaf, disruption of leaf metabolism and subsequent leaf blackening. *Leucospermum* is not susceptible to the blackening due to lack of, or the presence of inhibitors of PPO activity.